Citation:

Olsen SF, Østerdal ML, Salvig JD, Kesmodel U, Henriksen TB, Hedegaard M, Secher NJ. Duration of pregnancy in relation to seafood intake during early and mid pregnancy: prospective cohort. *Eur J Epidemiol.* 2006;21(10):749-58.

PubMed ID: 17111251

Study Design:

Prospective Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

The study addressed 4 issues:

- To examine whether seafood intake reported closer to the expected date of delivery might be more closely associated with various measures of pregnancy duration (the timing of spontaneous delivery, preterm delivery and early preterm delivery, which is delivery earlier than 6 weeks before the expected date of delivery) than intake reported earlier
- To examine the association between various levels of seafood intake and measures of pregnancy duration in women who reported to have the same intake of seafood during the two periods of pregnancy
- To examine the risk of preterm delivery in women with zero fish intake during a prolonged period of pregnancy
- To examine if seafood intake is associated with increased risk of elective and postterm delivery

Inclusion Criteria:

All pregnant women attending routine antenatal care in Aarhus, Denmark.

Exclusion Criteria:

- Any pregnancies that did not result in singleton, live born babies without detected malformations
- Women reporting intake of fish oil supplements

Description of Study Protocol:

Recruitment: Pregnant women attending routine antenatal care in Aarhus, Denmark were invited

to participate; however, recruitment details were not discussed. Informed consents were obtained from participants.

Design: Prospective cohort study

Blinding used: Assumed for data collection/analysis

Intervention:

Self-administered questionnaires were completed by participants in gestation weeks 16 and 30. Four questions were posted: 1) How often did you eat fish, 2) fish in a hot meal, 3) green salad or pasta salad with fish and 4) fish oil as a supplement. The women were asked to understand the term "fish" as also comprising roe, prawn, crab and mussel. Each question had six predefined response categories: never, less than once per month, 1-3 times per month, 1-2 times per week, 3-6 times per week and every day.

Statistical Analysis:

- Logistic regression model used to assess odds ratios including dummy variables representing each fish intake level
- Linear regression model used to assess differences in continuous outcome
- Cox regression model used to assess hazard ratios

Data Collection Summary:

Timing of Measurements: Self-administered questionnaires were completed in gestation weeks 16 and 30.

Dependent Variables

- Pregnancy duration

Independent Variables

- Seafood intake

Control Variables

- Sex of the infant
- Maternal smoking
- Alcohol consumption
- Maternal age
- Height
- Prepregnancy weight
- Maternal educational length

Description of Actual Data Sample:

Initial N: 8729 women

Attrition: Statistical analyses on women who had consumed hot fish meals and fish sandwiches with the same frequency in the first trimester (*n*=3287), the second trimester (*n*=3242) and both the

first and second trimester (*n*=764) were noted; however a final attrition number was not revealed in the study.

Age: Not noted by author. Adjustments were made for maternal age; however no age range was listed.

Ethnicity: Subjects were Danish women

Other relevant demographics: Not noted

Anthropometrics: Not revealed by author; however, adjustments were made for covariates.

Location: Aarhus, Denmark

Summary of Results:

Key Findings

- When the analyses were based on frequencies of fish meals reported for the first period, pregnancy duration was shortened by 3.9 (95% CI: 2.2-5.6) days and odds of preterm and early preterm delivery were increased by a factor 2.4 (95% CI: 1.2-4.6) and 7.1 (95% CI: 1.5-34), respectively, in women who never consumed fish vs those who consumed fish as a warm meal or as a sandwich at least once per week.
- When the analyses were based on frequencies of fish meals reported for the second period pregnancy duration was shortened by 3.1 days (95% CI : 1.4-4.8) and odds of preterm and early preterm delivery were increased by a factor 2.4 (95% CI : 1.2-4.8) and 2.2 (95% CI: 0.5-9.5), respectively, in women who never consumed fish vs those who consumed fish as a warm meal or as a sandwich at least once per week.
- In women that had given identical responses to all three questions about frequencies of fish meals (764 women), pregnancy duration was shortened by 8.6 days (95% CI: 5.5-11.7) and odds of preterm delivery were increased by a factor 20 (95% CI: 2.3-165), respectively, in women who never consumed fish vs those who consumed fish as a warm meal or as a sandwich at least once per week.
- Consuming zero fish was associated with a reduced risk of postterm delivery, both when fish intake was assessed in gestation week 16 and 30
- Zero fish intake tended also to be associated with reduced risk of elective delivery when fish intake was assessed in weeks 16 and 30 respectively although none of the confounder adjusted estimates were statistically significant.

Author Conclusion:

Never consuming fish in the fist two trimesters of pregnancy appeared to be a strong risk factor for preterm delivery in Danish women and all measures of association tended to become stronger when the sample was restricted to women reporting identical intake in the two periods.

Reviewer Comments:

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A

3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes

6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes

8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes